Trend Study 17-57-05

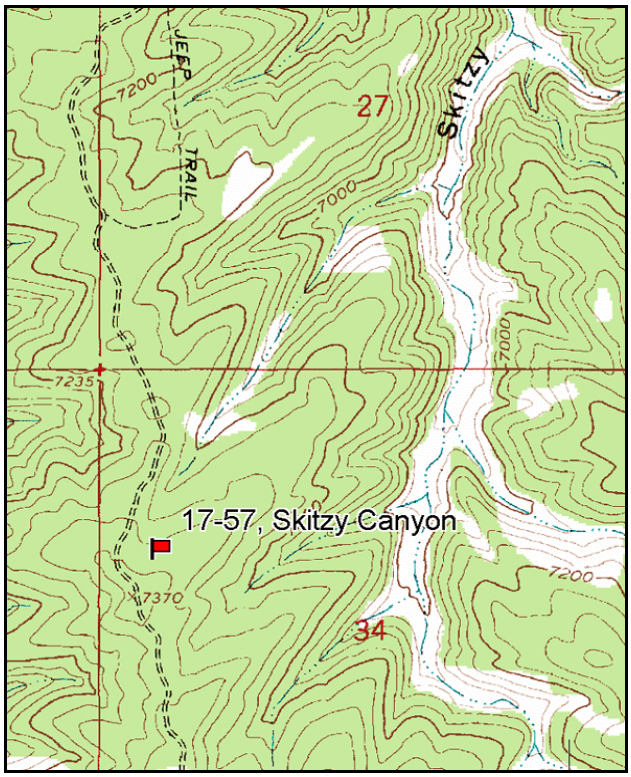
Study site name: Skitzy Canyon . Vegetation type: Chained, Seeded P-J .

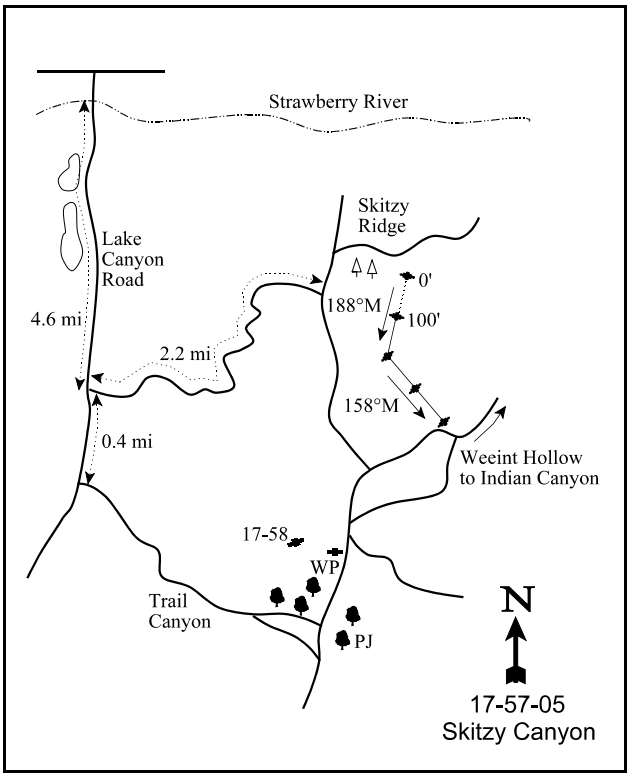
Compass bearing: frequency baseline 188 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 2 rebar @ 5ft.

LOCATION DESCRIPTION

From the Strawberry River, take the Lake Canyon Road (3239 West) south for 4.6 miles to a road which goes up the canyon to the east. Turn left and drive approximately 2.2 miles up to a "T" intersection at the top of the ridge. [Skitzy Ridge can also be reached via Trail Canyon the next (south) side canyon of Lake Canyon, or from Indian Canyon along the Weeint Hollow road.] At the top, look east into the chaining for two large conifers (Douglas firs). The 0-foot baseline stake is located to the east of the two trees. The baseline is marked by green, steel fenceposts approximately 12-18 inches in height.





Map Name: Buck Knoll

Diagrammatic Sketch

Township 4S , Range 6W , Section 34

GPS: NAD 27, UTM 12T 4437811 N, 537847 E

DISCUSSION

Skitzy Canyon - Trend Study No. 17-57

This trend study is located on a pinyon-juniper chaining in Skitzy Canyon. The area is considered deer and elk winter range. The site has an elevation of 7,300 feet and is located on a ridge top with a 5% slope. The land slopes gently to the north-northeast, draining into Skitzy Canyon. Management for this area is by the Utah Division of Wildlife Resources. Prior to the chaining and seeding in 1977-78, the site was dominated by Utah Juniper and Colorado pinyon. The area is used heavily by elk, deer, and livestock. Pellet group data from 2000 estimated 90 elk, 7 deer, and 9 cow days use/acre (222 edu/ha, 17 ddu/ha, and 22 cdu/ha). Deer pellet groups were recent while all cow pats were from the previous year. About half of the elk pellet groups encountered were from spring. In 2005, pellet group data estimated 195 elk, 80 deer, and 2 cow days use/acre (481 edu/ha, 198 ddu/ha, and 5 cdu/ha). Around 10% of the pellet groups were recent and the remainder were from fall and winter.

Soils are relatively shallow and rocky, but stabilized as a result of excellent herbaceous vegetation cover. Effective rooting depth is estimated at just over 10 inches with much of the rock encountered in the top 4 inches of the soil profile. Soil texture is a sandy loam with a slightly alkaline soil reaction (pH of 7.8). Percent organic matter is very high at 8.4%. Phosphorus levels at 62 ppm are very high and do not limit plant growth (Tiedemann and Lopez 2004). Erosion and soil loss prior to treatment was heavy, which resulted in patchy areas of pavement and bare ground. Much of this has since filled in with herbaceous vegetation and the rate of erosion is being controlled. The erosion index measurement in 2005 was stable.

Browse is a minor component of this chaining. No shrubs were encountered during the 1982 reading. Since 1988, black sagebrush has been the dominant shrub and population appeared to peak in 2000 at 820 plants/acre. By 2005, the population had decreased to 660 plants/acre. Use had been light until 2005 when it increased to moderate-heavy. Mountain big sagebrush is very sparse and densities have never surpassed 100 plants/acre. Use of this more preferred sagebrush was moderate to heavy. Other preferred browse species occur, but did not fall within the shrub density strips. These include true mountain mahogany and antelope bitterbrush.

Some pinyon and juniper trees were released after the chaining and have been increasing in density. In 2000, 21 pinyon and 23 juniper trees/acre were estimated. Average trunk diameter of pinyon was 2.8 inches and juniper was 2.6 inches. In 2005, tree densities had increased to 35 pinyon and 32 juniper trees/acre. Average trunk diameter increased to 3.5 inches for pinyon and 4.2 inches for juniper.

Grasses are dominant and have provided between 18% and 21% cover during all sampling years. The grass composition is very diverse with 14 species encountered in 1995, 12 in 2000, and 15 in 2005. Crested wheatgrass is the most numerous species. It averaged 11% cover in 1995, 13% in 2000, and 16% in 2005. Smooth brome and Russian wildrye are also fairly common. Forbs comprise a small percentage of the vegetation. The only common forb is looseflower milkvetch which provided 4% cover in 1995, 2% in 2000, and 1% in 2005. Seeded alfalfa was sampled in 1995 and 2000, but not in 2005, which indicates that it persisted on the treatment for over 20 years.

1982 APPARENT TREND ASSESSMENT

This area was chained in 1977-78. Since the chaining, the soil trend definitely appears to be improving. The development of vegetation cover and litter buildup has acted to reduce erosion and soil loss. The site supports a good herbaceous component but the current composition is not the most favorable for deer winter range. In time, shrub density will eventually increase through natural colonization of native species. However, if high value shrubs are desired more quickly, interseeding or transplanting would be required.

1988 TREND ASSESSMENT

Soil trend is considered stable with only a slight decline in basal vegetation cover and litter cover, combined with an increase in percent bare ground (7% to 12%). These slight changes do not warrant a change in trend. Erosion is not a problem due to the gentle terrain and good distribution of vegetation and litter cover. Since the chaining treatment in 1977, there has been surprisingly little change in the browse component on this area. As in the 1982 study, there were only a few individual browse plants encountered. Many young shrubs were observed throughout the area, but were not common enough to be sampled. The general view photographs show a slight increase in the prominence of woody species, but grasses still dominate the site. Trend for browse is considered slightly up but density is still very low. Trend for the herbaceous understory is slightly up. Quadrat frequency of grasses increased while frequency of forbs remained similar to 1982 values.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - slightly up (+1)

1995 TREND ASSESSMENT

Some ground cover characteristics have improved slightly since 1988, but not enough to warrant a change in trend. Litter cover declined from 68% to 54%, but percent bare ground also declined from 12% to 7%. Browse is still limited, yet it has continually increased in density. Black sagebrush has increased to 540 plants/acre, 52% of which are young plants. Trend is considered slightly up. Trend for herbaceous understory is stable. Sum nested frequency of grasses and forbs have remained similar to those of 1988. The Desirable Components Index rated this site as fair with a score of 41 due to excellent perennial grass cover and excellent forb cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - stable (0)
winter range condition (DC Index) - fair (41)Lower Potential scale

2000 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1995. There is no significant erosion occurring due to the excellent herbaceous understory and litter cover. Trend for browse is slightly up and continuing to slowly increase. Density is still poor. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses declined slightly, but the dominant grass species (crested wheatgrass, smooth brome and Russian wildrye) have remained stable. Sum of nested frequency of perennial forbs also declined slightly, but forbs currently provide only 11% of the herbaceous cover. The Desirable Components Index rated this site as fair with a score of 39 due to excellent perennial grass cover and fair forb cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - stable (0)
winter range condition (DC Index) - fair (39)Lower Potential scale

2005 TREND ASSESSMENT

The trend for soil is slightly down. The ratio of protective ground cover (vegetation, litter and cryptogams) to bare ground decreased. Relative bare ground cover increased from 6 to 17%. The trend for browse is also down. Black sagebrush, the key browse species decreased 20% in density, which was initially low. This decrease in density was accompanied by an increase in utilization from light to moderate-heavy use. Some young and seedlings were sampled, but not many. Mountain big sagebrush, the other preferred browse species sampled decreased 75% in density, leaving only a few individuals. No young individuals were sampled in 2005. The herbaceous trend is down. The sum of the nested frequencies of perennial grasses and perennial forbs decreased 25%. Significant decreases were seen in intermediate wheatgrass and smooth brome. Cheatgrass was also sampled for the first time, which indicates its possible expansion. The Desirable Components Index rated this site as fair with a score of 38 due to excellent perennial grass cover and fair forb cover.

TREND ASSESSMENT
soil - slightly down (-1)
browse - down (-2)
herbaceous understory - down (-2)
winter range condition (DC Index) - Fair (38) Lower Potential scale

HERBACEOUS TRENDS --
Management unit 17 , Study no: 57

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	Agropyron cristatum	$_{a}$159	$_{b}$259	$_{b}$261	$_{b}$257	11.42	13.32	15.62
G	Agropyron intermedium	$_{ab}$48	$_{ab}$56	$_{b}$61	$_{a}$28	.61	1.12	2.25
G	Agropyron trachycaulum	7	16	4	11	.64	.00	.49
G	Bouteloua gracilis	1	-	-	4	-	-	.01
G	Bromus inermis	$_{b}$60	$_{b}$74	$_{b}$72	$_{a}$11	1.89	2.04	.23
G	Bromus tectorum (a)	-	-	-	2	-	-	.00
G	Carex sp.	$_{b}$40	$_{a}$20	$_{a}$8	$_{a}$2	.13	.06	.03
G	Dactylis glomerata	-	1	-	-	.00	-	-
G	Elymus cinereus	4	17	9	8	.62	.74	.39
G	Elymus junceus	23	19	38	25	1.10	1.44	1.47
G	Elymus salina	-	-	6	-	-	1.23	-
G	Festuca ovina	$_{a}$-	$_{a}$1	$_{b}$20	$_{ab}$8	.03	.21	.10
G	Oryzopsis hymenoides	-	4	-	4	.18	-	.02
G	Poa fendleriana	$_{a}$-	$_{ab}$3	$_{ab}$2	$_{b}$9	.03	.03	.13
G	Poa secunda	$_{a}$-	$_{c}$32	$_{ab}$4	$_{bc}$17	.25	.04	.10
G	Sitanion hystrix	$_{c}$101	$_{b}$12	$_{a}$-	$_{ab}$4	.04	-	.06
G	Stipa lettermani	$_{c}$122	$_{b}$47	$_{ab}$34	$_{a}$8	.58	.45	.07
Total for Annual Grasses		0	0	0	2	0	0	0.00
Total for Perennial Grasses		565	561	519	396	17.56	20.72	21.01

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
Total for Grasses		565	561	519	398	17.56	20.72	21.01
F	Androsace septentrionalis (a)	-	$_{b}$40	$_{a}$2	$_{a}$-	.12	.00	-
F	Arabis sp.	$_{ab}$3	$_{bc}$12	$_{c}$19	$_{a}$-	.03	.04	-
F	Astragalus convallarius	$_{b}$12	$_{ab}$4	$_{a}$-	$_{ab}$3	.04	-	.01
F	Astragalus miser	$_{a}$-	$_{b}$15	$_{b}$17	$_{b}$18	.57	.48	.80
F	Astragalus tenellus	$_{b}$45	$_{a}$17	$_{a}$16	$_{a}$7	3.78	2.28	1.16
F	Chaenactis douglasii	-	5	3	2	.01	.00	.01
F	Descurainia pinnata (a)	$_{a}$-	$_{ab}$8	$_{a}$-	$_{b}$8	.02	-	.02
F	Eriogonum alatum	$_{b}$15	$_{ab}$12	$_{ab}$3	$_{a}$3	.14	.03	.03
F	Erigeron eatonii	3	2	-	-	.00	-	-
F	Eriogonum umbellatum	-	-	4	2	-	.00	.00
F	Gayophytum ramosissimum(a)	-	3	-	-	.01	-	-
F	Grindelia squarrosa	-	3	-	-	.00	-	-
F	Hedysarum boreale	-	1	-	3	.15	-	.53
F	Ipomopsis aggregata	1	6	-	-	.01	-	-
F	Lappula occidentalis (a)	-	-	-	5	-	-	.01
F	Linum lewisii	-	3	-	-	.00	-	-
F	Medicago sativa	-	7	3	-	.56	.21	-
F	Penstemon caespitosus	1	-	-	-	-	-	-
F	Penstemon pachyphyllus	-	5	-	3	.01	-	.03
F	Sisymbrium altissimum (a)	-	$_{a}$3	$_{a}$-	$_{b}$13	.00	-	.35
Total for Annual Forbs		0	54	2	26	0.15	0.00	0.39
Total for Perennial Forbs		80	92	65	41	5.34	3.07	2.58
Total for Forbs		80	146	67	67	5.50	3.07	2.97

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 17 , Study no: 57

Type	Species	Strip Frequency			Average Cover %		
		'95	'00	'05	'95	'00	'05
B	Amelanchier utahensis	0	0	1	-	-	-
B	Artemisia nova	12	15	14	.64	1.18	1.03
B	Artemisia tridentata vaseyana	5	4	1	.21	.84	.00
B	Chrysothamnus nauseosus	1	0	1	-	-	.00
B	Chrysothamnus viscidiflorus lanceolatus	0	1	0	-	-	-
B	Juniperus osteosperma	0	2	2	.03	.78	1.23
B	Pinus edulis	0	3	3	.03	.81	.66
Total for Browse		18	25	22	0.91	3.61	2.94

CANOPY COVER, LINE INTERCEPT --
Management unit 17 , Study no: 57

Species	Percent Cover	
	'00	'05
Artemisia nova	-	1.33
Artemisia tridentata vaseyana	-	.08
Juniperus osteosperma	-	.85
Pinus edulis	.60	1.16

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 17 , Study no: 57

Species	Average leader growth (in)
	'05
Artemisia nova	1.7
Artemisia tridentata vaseyana	3.0
Cercocarpus montanus	2.1
Cowania mexicana	2.0

POINT-QUARTER TREE DATA --
Management unit 17 , Study no: 57

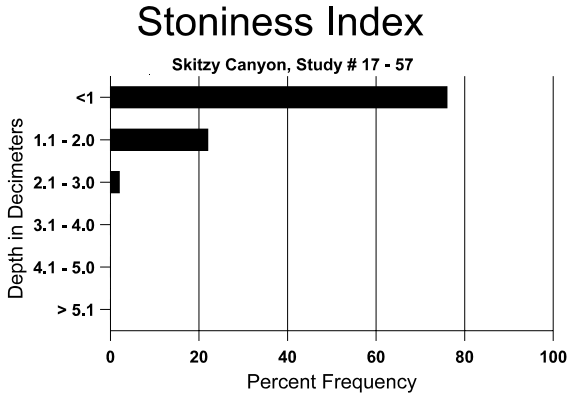
Species	Trees per Acre		Average diameter (in)	
	'00	'05	'00	'05
Juniperus osteosperma	23	32	2.6	4.2
Pinus edulis	21	35	2.8	3.6

BASIC COVER --
Management unit 17 , Study no: 57

Cover Type	Average Cover %				
	'82	'88	'95	'00	'05
Vegetation	7.50	4.75	26.94	29.00	26.73
Rock	3.25	4.50	12.60	5.57	6.23
Pavement	18.25	10.50	6.38	13.64	9.48
Litter	63.50	68.00	54.15	54.83	46.57
Cryptogams	.75	0	.05	.78	.01
Bare Ground	6.75	12.25	6.84	7.07	18.72

SOIL ANALYSIS DATA --
Herd Unit 17, Study # 57, Study Name: Skitzy Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
10.5	59.4 (14.3)	7.8	61.3	20.2	18.6	8.4	62.0	252.8	1.6



PELLET GROUP DATA --
Management unit 17 , Study no: 57

Type	Quadrat Frequency			Days use per acre (ha)	
	'95	'00	'05	'00	'05
Rabbit	7	6	27	-	-
Horse	3	1	-		-
Elk	42	57	68	90 (223)	195 (481)
Deer	6	5	14	7 (17)	80 (198)
Cattle	1	2	-	9 (23)	2 (5)
Antelope	-	1	-	-	-

BROWSE CHARACTERISTICS --
Management unit 17 , Study no: 57

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**20**	-	20	-	-	-	0	100	-	-	0	12/12
Artemisia nova												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**133**	-	-	133	-	-	0	0	0	-	0	8/11
95	**540**	300	280	260	-	20	48	0	0	-	0	17/32
00	**820**	40	100	480	240	20	12	0	29	-	0	14/27
05	**660**	200	60	420	180	20	33	42	27	3	3	16/29
Artemisia tridentata vaseyana												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**66**	-	-	66	-	-	0	0	0	-	0	15/10
95	**100**	-	40	60	-	-	20	0	0	-	0	27/42
00	**80**	-	20	40	20	-	25	25	25	-	0	23/38
05	**20**	-	-	20	-	-	0	100	0	-	0	29/52
Atriplex canescens												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	31/46
Ceratoides lanata												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	16/35

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Cercocarpus montanus												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	22/39
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	37/29
Chrysothamnus nauseosus												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**20**	-	-	20	-	-	0	0	0	-	0	31/33
00	**0**	-	-	-	-	-	0	0	0	-	0	34/45
05	**20**	40	-	-	20	-	0	0	100	-	0	32/44
Chrysothamnus viscidiflorus lanceolatus												
82	**0**	-	-	-	-	-	0	0	0	-	0	-/-
88	**0**	-	-	-	-	-	0	0	0	-	0	-/-
95	**0**	-	-	-	-	-	0	0	0	-	0	28/41
00	**20**	-	-	-	20	-	0	0	100	-	0	36/58
05	**0**	-	-	-	-	-	0	0	0	-	0	15/35
Cowania mexicana stansburiana												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	23/37
Juniperus osteosperma												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	40	-	-	-	-	0	0	-	-	0	-/-
00	**40**	-	40	-	-	-	0	0	-	-	0	-/-
05	**40**	-	20	20	-	-	0	0	-	-	0	-/-
Opuntia sp.												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	5/15

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Pinus edulis												
82	**66**	-	-	66	-	-	0	0	-	-	0	41/24
88	**66**	66	66	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**60**	-	40	20	-	-	0	0	-	-	0	-/-
05	**60**	-	40	20	-	-	0	0	-	-	0	-/-
Purshia tridentata												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	17/30
00	**0**	-	-	-	-	-	0	0	-	-	0	39/36
05	**0**	-	-	-	-	-	0	0	-	-	0	43/38
Sambucus sp.												
82	**0**	-	-	-	-	-	0	0	-	-	0	-/-
88	**0**	-	-	-	-	-	0	0	-	-	0	-/-
95	**0**	-	-	-	-	-	0	0	-	-	0	-/-
00	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	35/45